REMARKS

Claims 1-9 of the present application are currently pending. In the Office Action mailed February 12, 2003, claims 1-9 have been rejected.

In response, the cited references have been reviewed and the rejections made to the claims by the Examiner have been considered. Claims 1-3, 5, 8, and 9 have been amended and claim 10 has been added. For the reason set forth below, the Applicants respectfully traverse the rejections and submitted that all claims are in condition for allowance and allowance of the application is respectfully requested.

Rejections under 35 USC §102

Any Office Action dated February 12, 2003, claims 1, and 5-9 were rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 6,061,131, issued to Igushi et al. (hereinafter Igushi '131). For the reasons set forth below, the Applicants respectfully traverse the rejections and submit that the pending claims define patentable subject matter over the cited prior art.

For a reference to anticipate a claim under 35 U.S.C. §102 the reference must teach every element of the claimed invention. (See MPEP §2131).

Claim 1 of the present application is directed to a light scattering particle size distribution measuring apparatus and includes a light source capable of emitting laser light, a light shutter for modulating the laser light, a beam expander for expanding the laser light, a material cell containing a material sample, a condensor lens capable of focusing transmitted and scattered light, a photodetector capable of receiving scattered and transmitted light, at least one optical axis adjustment mechanism capable of automatically aligning and maintaining a central position of the photodetector with a central position of the laser light source, a multiplexer in communication with the photodetector and the optical axis adjustment mechanism, and a CPU in communication with the multiplexer in a personal computer. The CPU is capable of providing control signals to the at least one optical axis adjustment mechanism based on a signal received from the photodetector.

Claim 7 of the present application is directed to a light scattering particle size distribution measuring apparatus which irradiates a sample with light from a light source, detects the resulting scattered light from the sample by a photodetector, and measures the size distribution of particles in a sample on the basis of a scattered light intensity pattern. More specifically, the light scattering particle size distribution measuring apparatus includes an optical axis adjustment mechanism capable of holding control data antecedent to a decrease of a quantity of light when a quantity of light on a photodetector significantly lowered compared with the quantity of light antecedent to irradiating a sample by always monitoring the quantity of light antecedent to irradiating a sample and a quantity of light on a photodetector.

Claim 8 of the present application is directed to a method of using the scattering of light to measure the particle size distribution within a sample and includes irradiating a sample with light from a light source, detecting a resulting scattered light from the sample by a photodetector, monitoring a central position of the light source and the photodetector, monitoring a quantity of light antecedent to irradiating the sample and the quantity of light on the photodetector, measuring a size distribution of particles in the sample on the basis of a scattering light intensity pattern, and storing and retrieving an optimal position in a range of a quantity of light on a photodetector.

Claim 9 of the present application is directed to a method of using the scattering of light to measure the particle size distribution within a sample and it includes irradiating a sample of light from a light source, detecting a resulting scattered light from the sample by a photodetector, monitoring a central position of the light source and the photodetector, monitoring a quantity of light antecedent to irradiating the sample and a quantity of light on the photodetector, measuring a size distribution of particles in a sample on the basis of a scattered light intensity pattern, and aligning and maintaining a central position of said photodetector with a central position of said light source with an automatic adjustment mechanism.

In each of the embodiments, the optical axis of the laser light source and the photodetector is monitored. As a result, the system and method disclosed in the present application monitors whether or not the optical axis is deviated from and

considers measures taken when the optical axis is deviated from. That is, when the optical axis is deviated from , the system may take corrective action to reinstate the optical axis.

The Igushi '131 reference is directed to an optical axis adjustment apparatus and method of particle size distribution measuring equipment and includes a light source for providing a beam of light along an optical axis, a sample cell for holding a specimen and receiving a beam of light for scattering and/or diffraction by particles in the specimen, a detector assembly including a first set of detector elements for receiving the scattered and/or diffracted light from the sample cell and a second set of detector elements positioned in a common plane between the first set of detector elements and a third centroid detector element for positioning on the optical axis, a scattering and/or diffracting target member removably positioned on the optical axis between the light source and the detector assembly at a predetermined position to provide a predetermined diffraction pattern to the detector assembly, a means for automatically moving the target member onto the optical axis for calibration operation, a means for moving one of the light source in the detector assembly to align them on the optical axis, a first means for providing a measurement of the particle size distribution from output signals of the first set of detector elements when the scattering and/or diffracting target member is removed from the optical axis, a second means for measuring the predetermined scattered and/or diffraction pattern from output signals of the second set of detector elements when the scattering and/or diffracting target member is positioned on the optical axis to enable a movement of one of the light source and the detector assembly to align them on the optical axis, and a means for automatically moving the target member off of the optical axis after the calibration operation.

With reference to the rejection of claim 1 of the present application, the Igushi '131 reference fails to teach or suggest at least one optical axis adjustment mechanism capable of automatically aligning and maintaining a central position of the photodetector with the central position of light source. Claim 5 of the present application is dependent on claim 1. Therefore, the rejection to claim 5 must fail for the same reasons. Namely, the Igushi '131 reference fails to teach or suggest all of the elements of claim 5. With

reference to claim 6 of the present application, the Igushi '131 reference fails to teach or suggest a mechanism capable of automatically adjusting the central positions of the light source in the photodetector in a state most suitable for measuring by always monitoring the quantity of light antecedent to irradiating a sample and a quantity of light on a photodetector after irradiating a sample. With reference to claim 7 of the present application, the Igushi '131 reference fails to teach or suggest an optical axis adjustment mechanism capable of holding control data antecedent to a decrease of a quantity of light when the quantity of light on a photodetector significantly lowered compared with a quantity of light antecedent to irradiating sample by always monitoring the quantity of light antecedent to irradiating a sample and a quantity of light on a photodetector. With reference to claims 8 and 9 of the present application, the Igushi '131 reference fails to teach or suggest monitoring a quantity of light antecedent to irradiating a sample and a quantity of light on the photodetector. With reference to all the rejected claims of the present application, the Igushi '131 reference merely discloses determining whether the optical axis has been deviated from prior to carrying out a measurement.

As the Igushi '131 reference fails to teach or suggest every element disclosed in claims 1, 6, 7, 8 and 9 in accordance with M.P.E.P. §2131, the Applicants respectfully submit that claims, 1, 6, 7, 8, and 9 are not anticipated by the Igushi '131 reference. In addition, it is respectfully submitted that claim 5, which is dependent on claim 1, is also patentable.

Rejections under 35 USC §103

In the Office Action dated February 12, 2003, claims 2-4, which dependent on independent claim 1, were rejected under 35 U.S.C. §103(a) as being unpatentable over the Igushi '131 reference in view of United States Patent No. 5,007,737, issued to Hirleman et al. (hereinafter Hirleman). For the reasons set forth below, the Applicants respectfully traverse the rejections and respectfully submit that the pending claims define patentable subject matter over the cited prior art.

To establish a prima facie case of obviousness, three basic criteria must be met by the Examiner. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in

the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (see MPEP §2143.03).

The Hirleman reference is directed to a programmable detector configuration for Fraunhofer diffraction particle sizing instruments and includes a device for illuminating a particle field with a Fraunhofer diffraction pattern having a center axis, a transform lens which receives and focuses the Fraunhofer diffraction pattern from a particle field at its focal point to produce an output, a transform plate which is fixed at a focal point of the transform lens and comprises a spatial light modulator which physically separates different bands of light of the Fraunhofer diffraction pattern in order to produce an output by passing only light through concentric rings which are adjustable in radius and width about the diffraction pattern's central axis, a detector which receives and measures the Fraunhofer diffraction pattern from the transformed plane at increments that are adjusted by a spatial light modulator to indicate the particle size distribution by detecting magnitudes of discrete angular distributions of scattered light and the Fraunhofer diffraction pattern from the transform plane, an on-line test means which tests the particle sizing system using a particle field sample with a known particle size distribution which is compared to detected particle size distributions measured by the detector and comprising the diffraction reticle which includes a transparent sheet with a particle array of circular apertures with the known particle size distribution, a device for detecting the center axis of the Fraunhofer diffraction pattern from the transform plane and outputting a detection signal, and a device for controlling the spatial light modulator in the detector.

The Applicants respectfully submit that the rejection of dependant claims 2-4 must fail for at least the same reasons as set forth in the traverse or other rejection of claim 1 under 35 U.S.C. §102 above. In short, the Igushi '131 and Hirleman references, either alone or in combination, fail to teach or suggest all the elements of independent claim 1. More particularly, the Igushi '131 and Hirleman references fail to teach or suggest at least one optical axis adjustment mechanism capable of automatically

aligning and maintaining a central position of the photodetector with the central position of the light source.

Thus, the cited references do not disclose or suggest all the claim limitations in accordance with M.P.E.P. §2131. Therefore, the Applicants respectfully submit that claims 2-4 are patentable over the Igushi '131 and Hirleman references.

CONCLUSION

For the foregoing reasons, all claims presently on file in the subject application are in condition for immediate allowance, and such action is respectfully requested.

If it is felt for any reason that direct communication with applicants' attorney would serve to advance prosecution of this case to finality, the Examiner is invited to call the undersigned attorney at the below listed telephone number.

The Commissioner is authorized to charge any fee which may be required in connection with this Amendment to deposit account No. **50-1329**.

Respectfully submitted,

Dated: 7-11-03

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